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What We Have Learned from Research about the Prevention of HIV Transmission among Drug Abusers

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S Y N O P S I S

Objective. After more than 10 years of experience conducting behavioral change interventions and with accumulated research results, several emergent principles have been identified for the effective prevention of HIV transmission among drug abusers. In August 1997, a symposium was held in Flagstaff, Arizona, to achieve two major purposes: (1) to synthesize the findings from HIV prevention research conducted to date for interventions targeting drug abusers and (2) to extract a preliminary set of prevention principles that could be linked to effectiveness across at least two or more studies. This chapter summarizes the key findings of that symposium.

Methods. Major findings were abstracted from the conclusion sections of the presentations and from the chapters included in this special volume. Many consistencies regarding intervention approaches across studies were noted. These findings are discussed under the following headings: General Observations, Engagement, Multiple Interventions, Intervention Issues, Methodological Issues, and Translation from Research to Practice. Suggested areas for further research are also presented and discussed.

Results. Ten principles that have implications for HIV prevention interventions emerged from this preliminary review of the research. These principles engage drug users into the intervention; specify target behaviors and attitudes for intervention; suggest

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settings to optimize outreach; and recommend booster approaches to reinforce knowledge, skills, and attitudes learned through the intervention.

Conclusions. The drug abuse community is threatened by the incursion of HIV and by the hepatitis viruses A, B, and C. The same behaviors are involved in transmitting all of these viruses. The first generation of research to assess the impact of a variety of interventions delivered among drug abusers to prevent HIV has shown consistently favorable findings, proving that drug abusers can be helped to change their risky drug-using behaviors and, to a lesser extent, their risky sexual behaviors. The need to translate these findings for community practitioners is heightened by the devastating impact of HIV and AIDS.

The National Institute on Drug Abuse (NIDA) initiated funding of innovative interventions to prevent the transmission of the human immunodeficiency virus (HIV) in 1986. The aim of the research program at that time was to address the needs of injecting drug users (IDUs) in drug abuse treatment and IDUs not in treatment, with the added intent to reach their sex partners and children within the community setting. Since those early days of the research program, large numbers of drug users have been reached—those who inject and those who do not and those in drug abuse treatment and those not in treatment. As this research matured, so too has our understanding of the target populations, their risk behaviors, and our intervention approaches. In recognition of this maturity, a symposium was held in August 1997 in Flagstaff, Arizona, to begin to synthesize research findings across intervention approaches, to articulate common and consistent evidence of effectiveness, and to identify promising new strategies that warrant further research.

The purpose of the synthesis process was to determine (1) what intervention components are effective in changing behaviors that put drug abusers at risk for infection and (2) to what extent these changed behaviors are associated with HIV status. Other related questions include (1) whether more efficient interventions lead to involvement in other risky behaviors, that is, whether IDUs switch to noninjecting drug use; (2) which groups are overlooked by the current intervention approaches, for example, women, adolescents, or young adults; and (3) which components of the interventions are most effective.

Most of the research funded to date has focused on outreach and other innovative approaches to reach drug abusers in the community, on education sessions to instruct them about HIV transmission, and on counseling to show them how to lower their risks. Because of the rapid spread of the epidemic and the need to disseminate as much information as possible, interventions were initiated quickly; limited guidance was available from existing theories of behavior change that could have served as the foundation for developing these outreach models and counseling approaches. Indeed, at the time the interventions were designed, many believed that drug abusers, by the very nature of their drug problem, were different than the larger, nondrug-abusing population. In some ways, this view made it impossible to conduct efficacy studies of these new models and approaches to assess whether they were achieving their intended manipulations. For

example, it would have been useful to determine whether behavior change occurred when knowledge increased about how certain drug-using and sexual behaviors put individuals at risk for HIV infection. Efficacy studies of certain teaching approaches regarding use of condoms would have been useful, to determine whether these approaches actually increased condom use.

Instead, initially, researchers looked directly at changes in risk behaviors or main intervention effects, without examining what took place during these interventions that made the difference. This distinction is important for a number of reasons but primarily for the replication process: it is essential to understand how interventions work so the appropriate information can be transferred to practitioners at the community level.

Despite these limitations, a major achievement of this early research was to demonstrate that researchers could, indeed, educate this hidden and hard-to-reach population, record critical demographic information about it, show that drug abusers do care about their health and the health of their loved ones, and, most significantly, demonstrate that drug abusers are capable of changing their behaviors. Indeed, new theories of behavior have emerged as a result of this research.

METHODS

In an attempt to summarize the research findings regarding intervening to prevent HIV infection, I have developed a diagram that identifies the intervention process and intervention components that have been shown to be effective (Figure 1). Although sparse, several findings can help plan effective interventions to be tested within the

community and can be informative for our program and practitioner colleagues. What has not been specified can be classified under two major areas: which factors associated with changes in risk behavior are the interventions influencing and to what extent are these changed risk levels associated with negative HIV status.

In addition to the analyses included in the chapters presented in this Supplement and those presented at the meeting in Flagstaff, Arizona, in August 1997 (referenced in this chapter), a number of other activities are under way to continue these types of analyses using data from these interventions and newly added cohorts. Through these special studies, researchers will begin to address the effects of intervention manipulations and the preventive power of these effects.

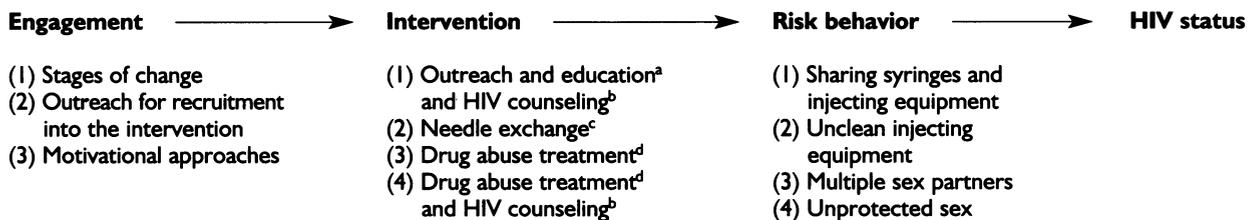
RESULTS

The major findings from the papers presented at the 1997 Flagstaff meeting (several of which are included in this Supplement) will be discussed under six sections: General Observations, Engagement, Multiple Interventions, Intervention Issues, Methodological Issues, and Translation from Research to Practice.

General Observations

Coyle and colleagues discuss in this Supplement perhaps the most striking consistent finding across studies: the relationship between the duration of exposure to, or content of, intervention and outcome.¹ In the 36 studies reviewed, length of time in the intervention was related to measures of positive changes in risk behaviors. This

Figure 1. Intervention process objectives and effective strategies



^aTraditional vs. peer driven

^bTraditional vs. social networks

^cBlack box; effective components not specified

^dMost research focuses on methadone maintenance.

observation is comparable to those from the literature reporting on the effectiveness of drug abuse treatment, in which length of treatment is highly associated with positive outcomes of treatment.²

What is key, then, is how to engage individuals and maintain their participation in an intervention. Some possible approaches for maintaining individuals in interventions are suggested by other researchers. For instance, Booth and his colleagues³ discuss findings regarding motivational interventions that hold the potential to engage and maintain people in an intervention when the intervention is tailored to their readiness for change. In addition, others⁴⁻⁶ suggest the effectiveness of contingency management methods, cognitive strategies, and the use of peer-driven interventions, respectively, that could maintain people in interventions.

The other important finding was the need for booster sessions to maintain positive behaviors, particularly while individuals remain within the community settings in which they have been abusing drugs. Questions remain as to content of the boosters, the number of boosters required over what period of time, and the timing for their most effective delivery; research must address each of these issues. Results from the fields of drug abuse treatment and prevention intervention research support the need for aftercare services to prevent relapse and for boosters to reinforce prevention principles.^{7, 8} However, even these fields raise questions as to the content of the boosters and the timing of their delivery.

Engagement

Engagement of at-risk individuals into an intervention is key to beginning the process of change. Two major findings from the research represented, particularly by Trotter,⁹ Baldwin and colleagues,¹⁰ and Valente and colleagues,¹¹ hold promise for approaches to engage individuals into an intervention. These approaches recognize that drug abuse and sexual risk behaviors are not individually experienced or defined; they are shaped by sharing of behaviors and by norms established within the social networks to which the individuals belong. Therefore, interventions must target not only the individual but also the individual's social and risk-behavior networks.

Trotter⁹ states that individual approaches to changing risk behaviors are limited. He points out that using a social network approach to intervention influences more people at the same time and, by changing the norms of the group, has the potential to sustain behavior change. He presents four different approaches to looking at social

networks: ethnographic, personal, social support, and full network intervention. Ethnographic approaches are more descriptive and tend to classify types of networks to make targeting an intervention more possible. Personal approaches address the individual within his or her social context. The social support approach intervenes with network members in pairs or multiperson targeted groups, whereas the full network approach addresses all network members and the network's special attributes. The literature suggests that the latter two approaches have the most significant impact on sustained behavior change.

The second major finding is the recognition of the drug abuser as a rational decision maker and incorporating intervention strategies that assist the process to decide to change risky behavior. Investigators have introduced methods to assess readiness for active involvement in behavior change and methods to move individuals and their networks from lower to higher levels of readiness for change. This approach has been informed by the work of Prochaska and DiClemente.¹² Booth and colleagues discuss the use of motivational interventions and risk reduction approaches to engage and build trust.³ These methods are significant because they begin to address the issue of readiness and to move individuals at risk along the readiness continuum. Baldwin and colleagues¹⁰ compared the findings of five intervention approaches delivered to injecting IDUs and non-IDUs in middle-sized cities: the NIDA standard, enhanced active outreach, enhanced network-based, enhanced combined with active outreach and network-based, and risk-focused. She suggests the advantages of targeting specific risk behaviors in an intervention, a risk-focused approach that involves individual problem solving and risk reduction. Having the individual identify personal sexual and drug-using risk behaviors increased the saliency of the intervention and brought promising findings, particularly for drug-using behaviors among men.

The saliency and timeliness of initiating an intervention was also mentioned by Stevens.¹³ Emphasizing the need to tailor interventions to the special needs of women, Stevens suggested the concept of trigger events such as pregnancy. At these critical periods, women are contemplating serious life changes and are more likely to attend to educational messages and counseling to alter their behaviors and protect their own health as well as the health of the unborn child. The idea of trigger events is not limited to women; men also face health or other potentially life-changing situations that make them ready to alter their lifestyles. The success of an outreach system, therefore, is that the outreach staff is available

and is viewed as a resource when such events occur. Timely recognition of these opportunities and rapid and appropriate responses will allow for active engagement and follow-through.

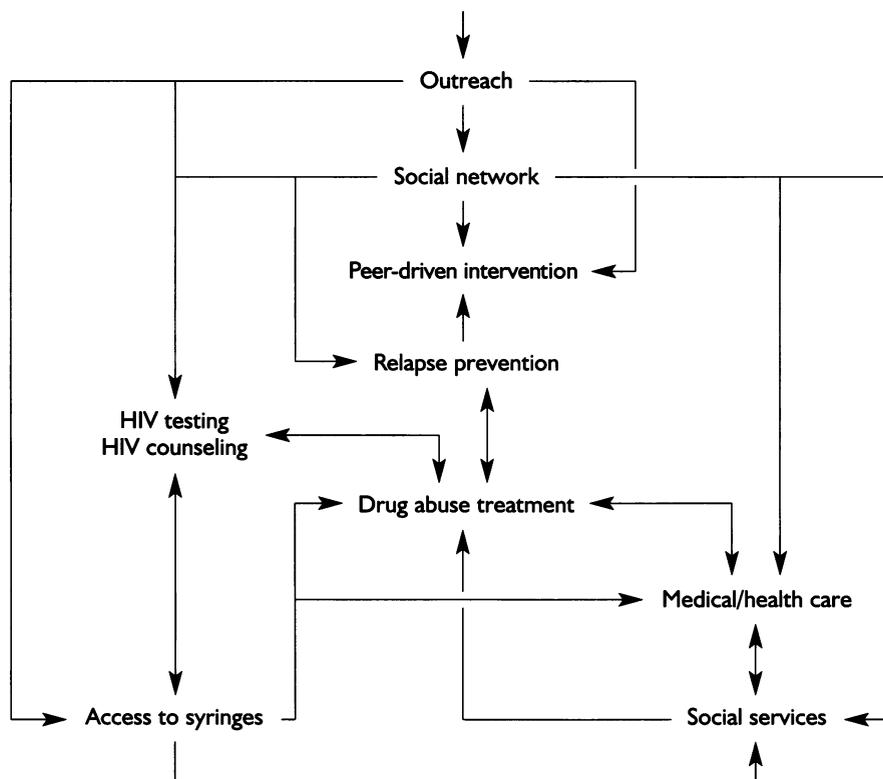
Engagement also means active involvement of those groups targeted for intervention. Latkin¹⁴ points out the importance of social influence and the role of community norms in supporting behavior change. In his research, individuals who either identified themselves or were nominated by a drug user as a leader in a drug-using group were trained to educate their network members about HIV transmission and to teach skills to reduce behaviors that put them at risk for HIV infection. Latkin found that actively involving these leaders in changing behaviors increased the effectiveness of the intervention.

Although one of the most exciting findings emerging from these studies is the creative approaches to engaging the networks of drug abusers, several caveats for the appropriate targeting of networks were offered. Networks that comprise a small number of members or are of short duration do not lend themselves to an intervention.

Multiple Interventions

The nature of behaviors being addressed by these interventions, as well as the recognition that individuals or networks are at different stages of readiness to alter their behaviors, suggests that multiple interventions are needed and should be integrated into a service delivery system. Figure 2 suggests that such a service delivery system should have many feedback loops and should connect innovative interventions such as needle exchange programs to institutionalized interventions such as treatment programs and health care services. Several chapters published here or papers presented at the Flagstaff meeting refer to the need for such a delivery system. Bluthenthal and colleagues,¹⁵ Booth and colleagues,³ Stevens,¹³ Hagen,¹⁶ and Metzger and colleagues¹⁷ all include this idea in their work. The most obvious linkage is between needle exchange programs and drug abuse treatment. However, including health or social services or referrals to such services within the treatment setting complements the treatment process, and perhaps enhances it.

Figure 2. System of comprehensive HIV prevention services within a community



The use of outreach to networks of drug abusers offers opportunities to alter norms and increase risk reduction skills, including accessing available drug abuse treatment and health and social service systems. Working with these networks around health and social issues would prepare network members for these changes and assist them in using the systems. Although not mentioned above, the outreach worker's role as advocate is central for drug abusers attempting to seek services within these unknown, and perhaps alien, organizations.

Several of the intervention studies used outreach workers, opinion leaders, and trained peers to fulfill a number of overlapping functions. For instance, in the research by Valente and colleagues,¹¹ satellite exchangers (SEs) performed a unique set of activities, such as serving as intermediaries between IDUs who wanted to maintain their anonymity or working with IDUs whose schedules did not coincide with the operating hours of the needle exchange program. The SEs enhance the work of the Indigenous Leader Outreach Workers discussed in Wiebel.¹⁸ This model trains drug users within the community to educate and recruit to counseling drug users within their own and other social networks. The peer-driven opinion leader approach involves selecting designated leaders within networks of drug users and educating and training these peers to work within their networks to alter risk behaviors and to establish the normative structure to support the new behaviors. Creating a role for community residents as outreach workers, peer leaders, or satellite exchangers is important for effective service delivery. Each of these roles has some unique features, but many features are common among all three; therefore, it may be possible and desirable to create a new community role that combines the most effective attributes of each of these three roles.

One of the other themes discussed in these chapters relates to level of intervention—individual, network, and community and environment. Less well articulated but of strong presence are the community and the importance of community factors in changing risk behaviors. Community encompasses the physical environment and social norms, expectancies, and reinforcements. Physical environment and social norms are somewhat synergistic: eliminating places used as shooting galleries, cleaning up parks, and instituting neighborhood watches are important visible actions that convey community disapproval of drug use. Establishing locations where clean syringes can be purchased (such as in pharmacies), where dirty syringes can be safely discarded, or where condoms can be made available (such as in taverns or restaurants)

also support the community's emphasis on the health and safety of its residents. Giving drug users the opportunity to advocate for themselves is another important community component of an intervention.

Intervention Issues

The papers presented at the Flagstaff meeting suggested a number of research issues relative to prevention interventions targeting IDUs. The need for further refinement of existing interventions does not detract from the wealth of findings that have emerged from these first-generation studies. However, to find more effective interventions for devastating diseases such as acquired immunodeficiency syndrome (AIDS) necessitates the establishment of principles for prevention intervention that target high-risk behaviors. Principles that emerged from the Flagstaff meeting begin to provide insight into what makes interventions work and were found to be consistent across several studies; these principles are listed in Table 1. However, these principles should be viewed as preliminary, and future research should be designed to enhance them and to add new ones.

Several issues still need to be addressed:

- Clearer specification of intervention components.
- Intervention dose *vs.* intervention content.
- Sustaining behavior change.
- The relationship between self-assessment of risk and behavior change.
- The relationship between attitudes about the risky nature of behaviors and changing these behaviors.
- Gender differences in responding to interventions.
- Decision-making processes when engaging or disengaging in high risk behaviors.
- Rethinking drug abuse treatment;
- Integrating HIV prevention within institutional health and social service systems.
- The relationship between HIV/HBV/HCV-specific preventive interventions and general health promotion.

Table 1. Principles for the prevention of human immunodeficiency virus (HIV) among drug abusers

- Start HIV prevention interventions early in the epidemic (or as early as possible)
- Risk reduction is an appropriate, realistic outcome of HIV interventions with drug abusers
- Implement multiple intervention strategies—such as outreach, HIV testing and behavior change education and counseling, drug abuse treatment, and needle exchange
- Recognize that populations at risk for HIV infection are in various stages of readiness to participate in interventions to alter their behaviors and need to be engaged appropriately in order to maintain them in the interventions by using:
 - Motivational techniques and/or
 - Contingency management and/or
 - Cognitive strategies and/or
 - Peer-driven interventions
- Target multiple risk behaviors simultaneously, including drug use, needle risk, and sexual practices
- Provide access to multiple means (intervention components) for behavior change, including:
 - Risk reduction information
 - Risk reduction supplies, including syringes, bleach and related injection hygiene materials, and condoms (male and female)
 - HIV antibody testing with pretest and posttest supportive and behavioral counseling
- Implement interventions in multiple settings to reach as many of the at-risk populations and subgroups as possible, e.g.,
 - Streets and other places where drug abusers congregate
 - Health-related settings, such as clinics, pharmacies, drug treatment centers
 - New outlets established to attract drug users, such as mobile vans, storefront offices, and needle/syringe exchanges
- Rely on indigenous community residents to serve as outreach workers, role models and educators, or advocates for the target population
- Implement interventions at multiple levels (policy, legal, institutional, community, network, and individual) to alter community behavioral norms and risk behaviors to create opportunities for at-risk individuals to make and sustain behavior change in a supportive environment
- Create opportunities for increased exposure to interventions through booster sessions to reinforce skills and knowledge learned in the initial intervention and to further extend the effectiveness of the interventions

Intervention specifics. Perhaps the strongest intervention issue is to clarify the components of the interventions. Which components were included in the intervention, which components were actually delivered, and how those components were delivered must be better described and measured in all intervention research. This specific information will help researchers understand what happened during the intervention period and will allow improved transference of effective intervention components.

Dose vs. content. Designing effective interventions requires disentangling the issues of dose and content: determining how much intervention is needed and the minimal types and numbers of services to be delivered. Furthermore, services must be better matched to the needs of individuals and their networks.

Sustaining behavior change. Many of the interventions described in this issue demonstrate behavior change, most often drug-using behaviors. However, to what extent these changes are sustained over time is not well demonstrated, with the exception of methadone maintenance treatment. Research suggests that altering the norms of social support systems, particularly within the communities where most of the target population resides, is important in reinforcing behavior change. More research is needed to determine to what extent these norms prevail and to what extent countervailing forces cause recidivism. It is clear that some type of booster intervention should be designed to support behavior changes that occur as a result of the original intervention, as well as to enhance or encourage other behavior changes.

Relationship between self-assessment of risk and behavior change. Increased perception of personal saliency and perceived susceptibility, in conjunction with effective education and behavior change counseling, have been suggested as influencing behavior change. Measuring this association has been discussed, but more focused study of this relationship should provide the information needed to improve intervention approaches.

Relationship between attitudes regarding risk behaviors and behavior change. Research has focused for many years on the relationship between attitudes and beliefs, expectations, and behavior. Models of health action, such as the Health Belief Model¹⁹ and the Theory of Reasoned Action,²⁰ include components on attitudes regarding severity of risk and perceived personal suscepti-

bility. These models indicate that a relationship between these perceptions and initiating or intending to initiate a health behavior are moderated by social norms and other influences. The findings from several of the studies presented in this issue as well as at the Flagstaff meeting suggest that, for HIV risk behaviors, a combination of both perceived severity of risk and personal susceptibility to risk should be addressed in the intervention. However, it is not clear to what extent interventions directly address these attitudes and the degree to which existing attitudes are barriers to intervention engagement.

Differential responses to interventions by gender.

Several researchers reported that women were less likely to participate and to remain in an intervention unless their specific needs were met. It was not always clear why women did not engage in or respond to interventions. Women tend to be more difficult to reach, and their drug use tends to be hidden. Stevens,¹³ however, found that women could be engaged at points—trigger events—when they self-identified as most at risk, either during pregnancy or when there was a rift in their relationship with a significant other. Outreach targeting women within the community must be more innovative, to the extent of going into not only the community but also apartment buildings where women live.

Decision-making processes when engaging or disengaging in high risk behaviors. Drug-abusing individuals engage in high risk behaviors even when they are aware of the risks. The physiological demand for drugs combined with the difficulty of obtaining drugs and clean injection equipment strongly influence the decision to initiate behaviors that put IDUs at risk for HIV infection. Nevertheless, some IDUs are able to cope with these pressures and make more informed decisions about their own risks and how to prevent infection. This latter group needs to be studied to understand the influences on their decision-making processes more fully. Understanding their coping strategies may allow ongoing interventions to incorporate these coping strategies.

In the current intervention climate, the assumption that all IDUs are at equal risk for becoming infected with HIV is not accurate. A number of IDUs as well as non-IDUs may believe they are not at all at risk—and they may indeed be at low risk. For instance, an IDU who lives in an area of low prevalence of HIV and AIDS and who shares equipment only with injecting partners known to be HIV negative may continue to share without risk of infection. We need to better understand to what extent

our target population engages in these types of decision-making processes and to fashion interventions and counseling approaches to address these perceptions head-on. Existing levels of susceptibility to HIV infection need to be raised, particularly because HIV infection is not the only health risk for this population.

Rethinking drug abuse treatment. One of the most striking findings of the studies of out-of-treatment drug abusers is the high percentage who never avail themselves of treatment. This finding is particularly distressing because effective treatments for drug abuse are well known. The question is whether our treatment approaches today meet the specific needs of current drug abusers. The treatment field developed predominantly in response to the increased use of heroin during the 1960s and 1970s. The picture of drug abuse in the United States today shows that not one but several drugs are used separately or in combination. These include cocaine in powder form or as crack, methamphetamines and other stimulants, marijuana, depressants and sedatives, and alcohol and tobacco. Drug abuse treatments today are generally classified as being pharmacotherapies with or without behavioral and psychosocial counseling, with or without instrumental services such as vocational rehabilitation, and either inpatient/in residence or outpatient/in community.

Evidence from epidemiologic research indicates that most drug abusers initiated use in early to midadolescence. It is clear, then, that drug-involved individuals may not have developed psychologically or socially in the same way as their nondrug-involved peers. Therefore, once drug-involved individuals enter treatment, their social and psychological growth must be addressed along with their drug use and dependence. Assessments within the treatment setting must include these developmental measures so that services can meet the maturational needs of clients. Conceptualization of drug abuse treatment must go beyond the standard modalities and begin to focus on combinations of services designed to address the physiological effects of drug abuse and behaviors, the psychosocial consequences of these behaviors, and the factors that led to and sustained drug abuse to include both distal and proximal etiologic factors.

Integrating HIV prevention within institutional health and social service systems. Little information exists as to the degree to which HIV prevention services are integrated within the established health and social service systems. If we are to reach more drug abusers,

particularly those most difficult to reach and perhaps, as Deren²¹ points out, those most at risk, services must be available through a number of channels. In this way, the probability of engaging those at risk when they are ready for change is increased. In addition, the incorporation of these services within established institutions removes some of the stigma associated with free-standing, HIV-labeled programs.

The relationship between HIV/HBV/HCV-specific preventive interventions and general health promotion. Typical of categorical programming, the focus of HIV and other infectious disease interventions is on these specific health problems. Drug abuse treatment also usually focuses on treating the drug use rather than on general health, despite a growing body of literature on the concomitant medical consequences of drug abuse. This narrow focus is best exemplified by the failure to include morbidity and mortality statistics and other functional measures as outcomes in most studies of drug abuse treatment. It is therefore important to include health promotion and disease prevention in all programs that reach out to drug users.

Methodological Issues

The methodological issues raised here include follow-up, measurement of risk, the difference between clinical and statistical significance in behavior change, implementation fidelity, and research design.

Follow-up. Follow-up and attrition are probably the most important methodological issues for studies of intervention effectiveness. Follow-up issues are important for understanding when behavior change takes place and how long it is sustained. In the studies presented in this Supplement and in papers presented at the Flagstaff symposium, variation occurred in the timing of follow-up: sometimes it was three months, sometimes six months, and in some cases 12 months. Within these studies, the number of follow-up contacts over time is inconsistent. Few of the studies contain more than one follow-up. This is unfortunate, as circumstances change over time and an individual may engage in varying patterns of risk behaviors. Therefore, it is important to know what those patterns are and what factors influence them. If we are to design booster interventions for individuals exposed to earlier behavior change programs, it is important to target the most at-risk periods, when the effects of the intervention are most likely to erode.

Attrition, which is closely associated with follow-up, is one of the greatest challenges for researchers evaluating the impact of an intervention. Differential attrition, in which a greater number of either the control or experimental group disengage from the study, has been the "albatross" of evaluation researchers. It is believed that individuals who drop out are more likely to be involved in high risk behaviors. However, it may be as likely that they have left the drug scene. Statistical approaches have been developed to overcome the missing data issue, but such approaches are not always adequate substitutes for good tracking and follow-up. The drug abuse research field differs as to the ease with which successful follow-up occurs. Given enough time, most researchers are able to "recapture" a significant number of subjects. Certainly, obtaining sufficient tracking information at the time of the initial contact is key to lower attrition rates. Although most drug abusers have limited mobility, the degree to which they are involved in the drug scene, are employed, and are involved in a stable social network and support system will determine the availability for follow-up. Understanding the movement of drug abuser networks and having information about parents and long-term friends increases the possibility of contact. It is also important to check with police officers, corrections officials, and health department vital statistics officials to determine the whereabouts of research subjects.

Measurement of risk. Measuring risk is not only an issue for the risk behavior itself but also for measuring change: some risk behaviors are easily changed, some increase HIV infectivity, and some only increase HIV infectivity under certain conditions. No systematic analysis of these behaviors has been completed, nor has a standardized classification or measurement system been developed. Such standardization would allow comparison across intervention approaches and the opportunity to study behavior over time. Measuring behavior changes also requires attention; questions include whether to standardize changes on the basis of baseline measures and whether a weighted index of behavior change is warranted.

Clinical vs. statistical significance in behavior change. The issue of clinical vs. statistical significance of risk behavior change was raised by Stevens at the Flagstaff meeting. Clinical significance would relate to decreased infection and to HIV status; most of the studies that evaluate interventions seek statistical significance. However, if there are statistically significant

changes without decreased HIV infectivity, the significance of those changes is meaningless. More attention needs to be given to the relationship between these measures across high and low prevalence areas, as this relationship may differ depending on the extant HIV levels in the community.

Implementation fidelity. Intervention researchers often assume equal implementation across population groups and across communities. Drug abuse prevention researchers have documented that interventions that are not fully implemented or are implemented with less than appropriate fidelity to the original program model are associated with poorer outcomes^{8,22} and have emphasized the need to ensure high fidelity in intervention delivery. Without monitoring fidelity, it is difficult to determine whether the intervention is delivered as designed and thus how weak or strong the intervention impact will be. It is also important to ascertain to what extent the subjects had been involved in all or part of any multiple component intervention, and to include measures of intervention exposure in the analyses.

Research design. The “gold standard” for assessing an intervention is the experimental design that uses random assignment to either a treatment or no-treatment control condition. However, it is not always possible or even advisable to use random assignment, particularly in those situations, such as within the community setting, in which it is difficult to limit the interaction between the two groups or when a serious disease such as AIDS is being prevented and a nontreatment option is unethical. Alternatives to the true experimental design have been developed to enable researchers to assess the impact of the intervention. There are advantages as well as disadvantages to these approaches, depending on the extent to which the selected design deviates from the model experimental design.

Other questions that need to be addressed focus on who is reached by interventions:

- What is the universe from which subjects come, in terms of demographics and risk behaviors?
- Who benefits most from these interventions? Who benefits least?
- What are the characteristics of individuals who change behaviors and maintain these changes vs. the

characteristics of those who do not change behaviors at all as a result of the intervention?

- What impact do the interventions have on HIV-positive subjects?

Translation from Research to Practice

A key issue that faces the field of intervention in general is how to translate the research findings for more widespread practice. How can we make our findings easy to find, easy to understand, and easy to implement? Researchers alone should not take the lead in moving effective intervention components into the community. Bridge builders, language engineers who come from the community but who understand the research world, need to translate the process and product and to smooth out the transference process while maintaining the integrity and fidelity of the intervention. Hands-on approaches should be used, including videos of how the programs have been implemented, manuals describing how the programs operate, workshops to train practitioners to deliver the intervention, and instruments to enable practitioners to assess intervention effectiveness on an ongoing basis; improving delivery outcomes by modifying delivery techniques should also be included. Getting the word out to practitioners is best done through regional conferences with indepth workshops. These conferences can be developed in collaboration with groups with access to the local community, such as state departments of health.

DISCUSSION

Where do we go from here? It is clear that multi-component, comprehensive, community-based programs are needed. These programs can be launched even with the limited knowledge accrued to date. However, more research is needed as to the specificity of the impact of intervention components, with a particular emphasis on mediating variables such as knowledge, skills, attitudes, and beliefs that lead to behavior change. More research is also needed on the context of the onset of risk behaviors, not only in adulthood but also from childhood to young adulthood. More innovative intervention models need to be studied to address the needs of adolescents and women. Finally, we need to reexamine drug abuse treatment approaches, meeting the needs of those drug abusers who are difficult to treat, are nonopioid polydrug users, have severe antisocial personality disorders, and are not motivated to enter treatment.

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